

OBSERVATIONS & RECOMMENDATIONS

After reviewing data collected from **SUNCOOK PONDS** the program coordinators recommend the following actions.

Upper Suncook Pond

FIGURE INTERPRETATION

- Figure 1: These graphs illustrate concentrations of chlorophyll-a in the water column. Algae are microscopic plants that are a natural part of lake ecosystems. Algae contain chlorophyll-a, a pigment necessary for photosynthesis. A measure of chlorophyll-a can indicate the abundance of algae in a lake. The historical data (the bottom graph) show a *slightly improving* in-lake chlorophyll-a trend, meaning the concentration has decreased over the years. The mean for this summer's results remain well below the state mean reference line. While algae are present in all lakes, an excess amount of any type is not welcomed. Algal concentrations can increase when there are external and internal sources of phosphorus. Phosphorus is the nutrient that algae depend upon for growth. It's important to continue the education process and keep residents aware of the sources of phosphorus and how it influences lake quality.
- Figure 2: Water clarity is measured by using a Secchi disk. Clarity, or transparency, can be influenced by such things as algae, sediments from erosion, and natural colors of the water. The graphs on this page show historical and current year data. The lower graph shows a *variable* trend in lake transparency. This year's average reading was above the New Hampshire mean for the first time since 1994. The field data sheet for the September sampling indicated that the wind and waves likely reduced the visibility in the pond at that time. The 2000 sampling season was considered wet and, therefore, average transparency readings are expected to be slightly lower than last year's readings, but this is not the case in the Suncook Ponds. Higher amounts of rainfall usually cause more eroding of sediments into the lake and streams, thus decreasing clarity. Guides to Best Management Practices are available from NHDES upon request.
- Figure 3: These figures show the amounts of phosphorus in the epilimnion (the upper layer in the lake) and the hypolimnion (the lower layer); the inset graphs show current year data. Phosphorus is the limiting nutrient for plants and algae in New Hampshire waters.

Too much phosphorus in a lake can lead to increases in plant growth over time. These graphs show an *improving* trend for epilimnetic phosphorus levels, meaning concentrations are decreasing, and a *variable* trend for the hypolimnetic concentrations. The epilimnetic average was less than last year's mean concentration. The high phosphorus concentration in the hypolimnion during the September sampling may have been caused by the wind and waves. The hypolimnetic mean experienced a slight increase from last year's concentration. We will watch for this high level to occur again next year. One of the most important approaches to reducing phosphorus levels is educating the public. Humans introduce phosphorus to lakes by several means: fertilizing lawns, septic system failures, and detergents containing phosphates are just a few. Keeping the public aware of ways to reduce the input of phosphorus to lakes means less productivity in the lake. Contact the VLAP coordinator for tips on educating your lake residents or for ideas on testing your watershed for phosphorus inputs.

OTHER COMMENTS

- The dissolved oxygen was depleted at the bottom of the pond to the 9-meter level (Table 9). As we explained in last year's report, bacteria can remove oxygen from the water during the later part of the summer when they decompose organic matter. If the oxygen gets below 1 mg/L it can cause a release of phosphorus to the water column. We did not see a high concentration of phosphorus in the hypolimnion when the dissolved oxygen was tested in July. We would advise the association to schedule the biologist's visit in August or even September so we can monitor the oxygen with relation to the phosphorus concentration at that time of the year.
- The Suncook at White Oak site was not tested this summer, but the Suncook River Inlet was sampled. It was suggested in the 1999 report that the Suncook River Inlet sample be eliminated because the Suncook at White Oak sample is a sufficient site for collecting samples in that inlet. Also, the conductivity was quite high in 1999 at the Suncook at White Oak site. We will again recommend that the volunteers attempt to collect samples at the White Oak site in 2001 and not in the Suncook River Inlet.
- The Camp Fatima Inlet was not sampled at the usual site during the July visit due to lack of flow. An upstream sample was collected at that time. Upon comparing the two sites there does not seem to be a great difference in water quality. However, both sites had high phosphorus concentrations (Table 8). While the average for the usual site was not as high as in the past, it is considered a high value. We suggest that the association walk the length of this inlet, bracket the brook, and collect a series of samples. Collecting samples at several sites along the Camp Fatima Inlet will help us determine the sources of nutrients.

- This year was the first year the Nighthawk Hollow Inlet was sampled. In general, the water quality appears to be good. The conductivity at this site was the highest tested in the Upper Suncook watershed this year (Table 6), but it was not excessive. The total phosphorus at this site falls between our good and average ranges (Table 8). We will continue to observe the water quality at the Nighthawk Hollow Inlet in the years to come.

Lower Suncook Pond

FIGURE INTERPRETATION

- Figure 1: This station has a generally *stable* in-lake chlorophyll-a trend. This year's mean was much lower than the two years previous and remains below the state mean.
- Figure 2: The clarity in Lower Suncook Pond remains *stable* and the average has increased slightly from 1998 and 1999. The mean was again below the state mean reference line.
- Figure 3: Epilimnetic phosphorus has been *fairly stable* since 1991, with a few fluctuations. This year's mean concentration was only slightly elevated from last year's.

OTHER COMMENTS

- This summer, only one in-lake sample was taken in Lower Suncook Pond due to a nearly isothermal (i.e. no large change in temperature) dissolved oxygen profile. The lack of thermal stratification suggests that the water column is well mixed. The dissolved oxygen remains high at all depths in this section of the pond (Table 9).
- The Narrows Road Inlet was sampled only once this summer, but the conductivity was one of the lowest values recorded at this inlet since the pond joined VLAP (Table 6). It's possible that the pollutants that were concentrated in the tributaries last year were flushed out with the rain this year. However, the total phosphorus concentration was two times higher than the 1999 mean. We will continue to observe this inlet.

USEFUL RESOURCES

A Brief History of Lakes, NH Lakes Association pamphlet, (603) 226-0299 or www.nhlakes.org

Answers to Common Lake Questions, NHDES-WSPCD-92-12, NHDES Booklet, (603) 271-3503.

Anthropogenic Phosphorus and New Hampshire Waterbodies, NHDES-WSPCD-95-6, NHDES Booklet, (603) 271-3503

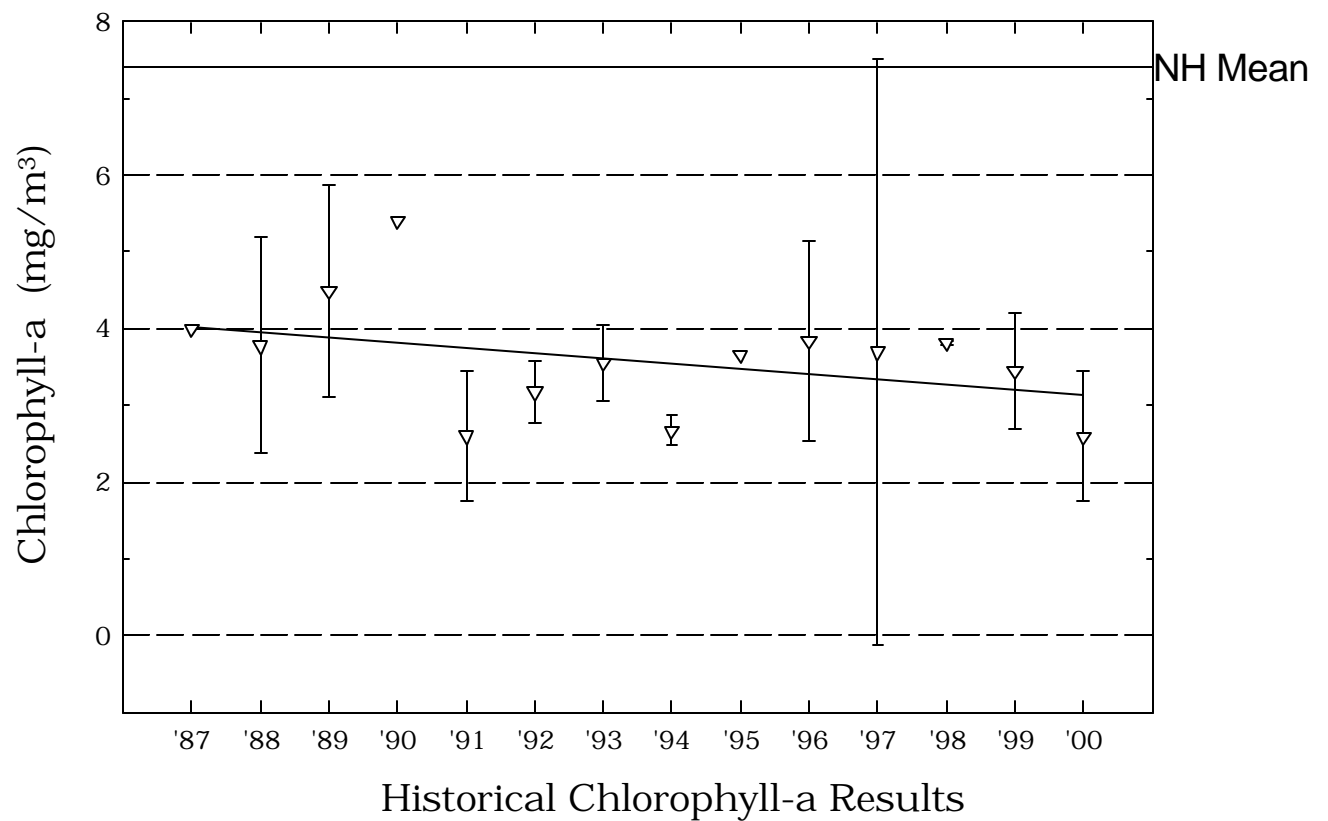
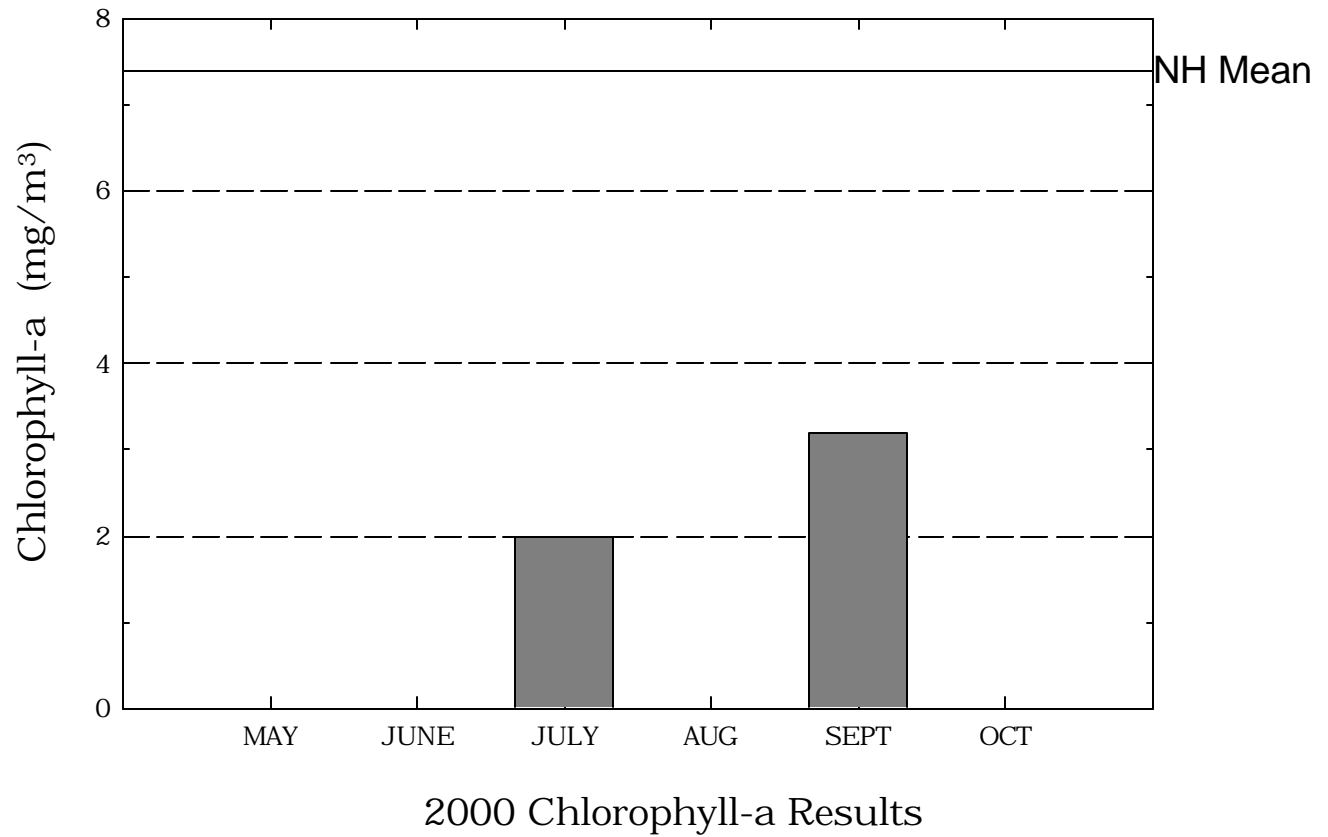
2000

What Can You Do to Prevent Shoreland Erosion?, WD-BB-30, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

Water Milfoil, WD-BB-1, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

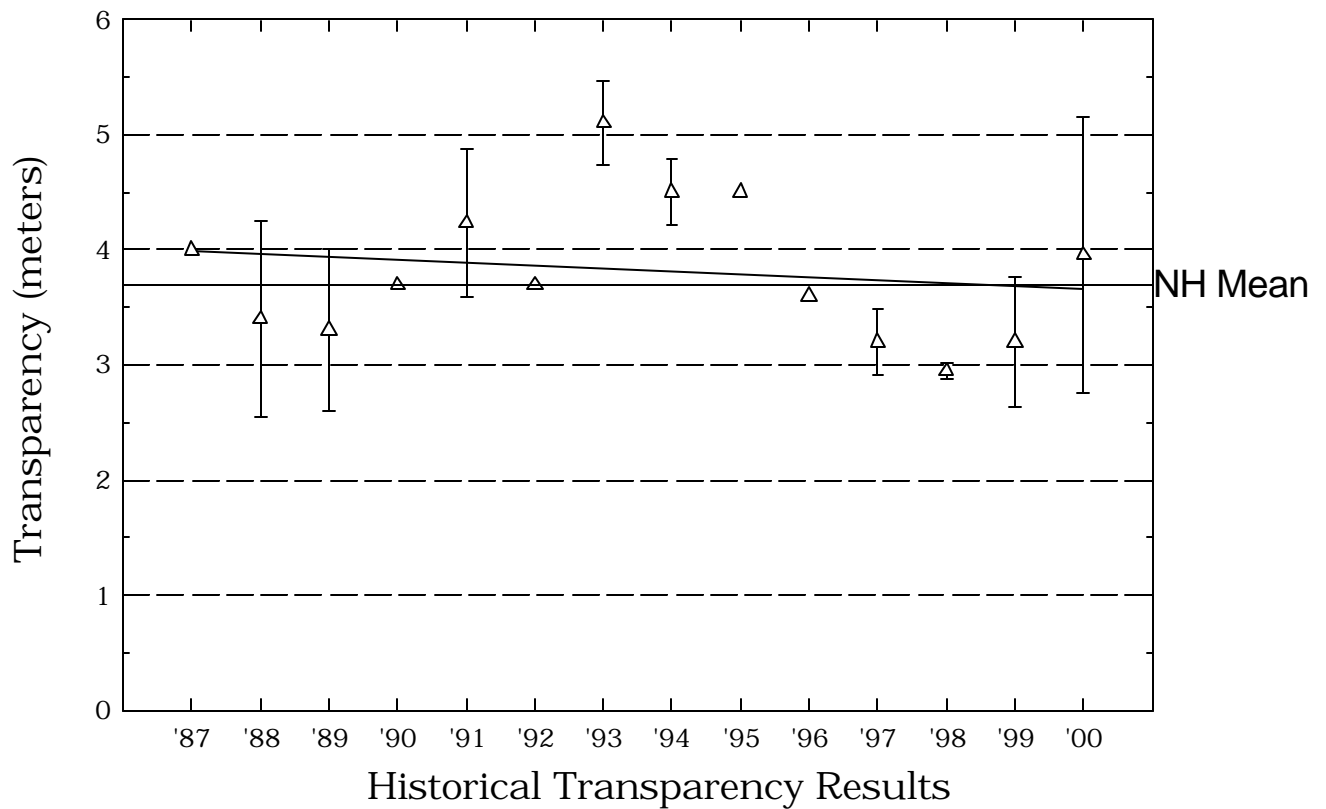
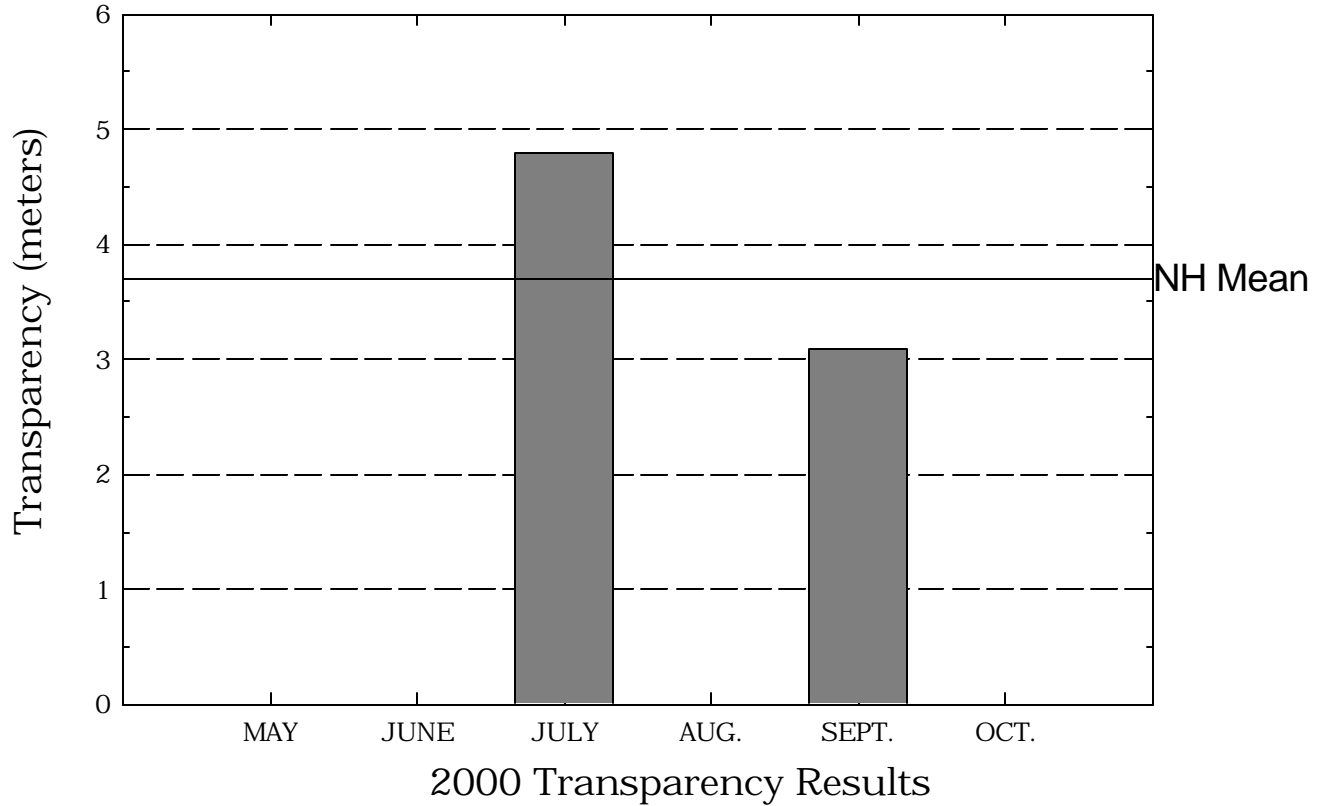
Upper Suncook Pond

Figure 1. Monthly and Historical Chlorophyll-a Results



Upper Suncook Pond

Figure 2. Monthly and Historical Transparency Results



Upper Suncook Pond

Figure 3. Monthly and Historical Total Phosphorus Data.

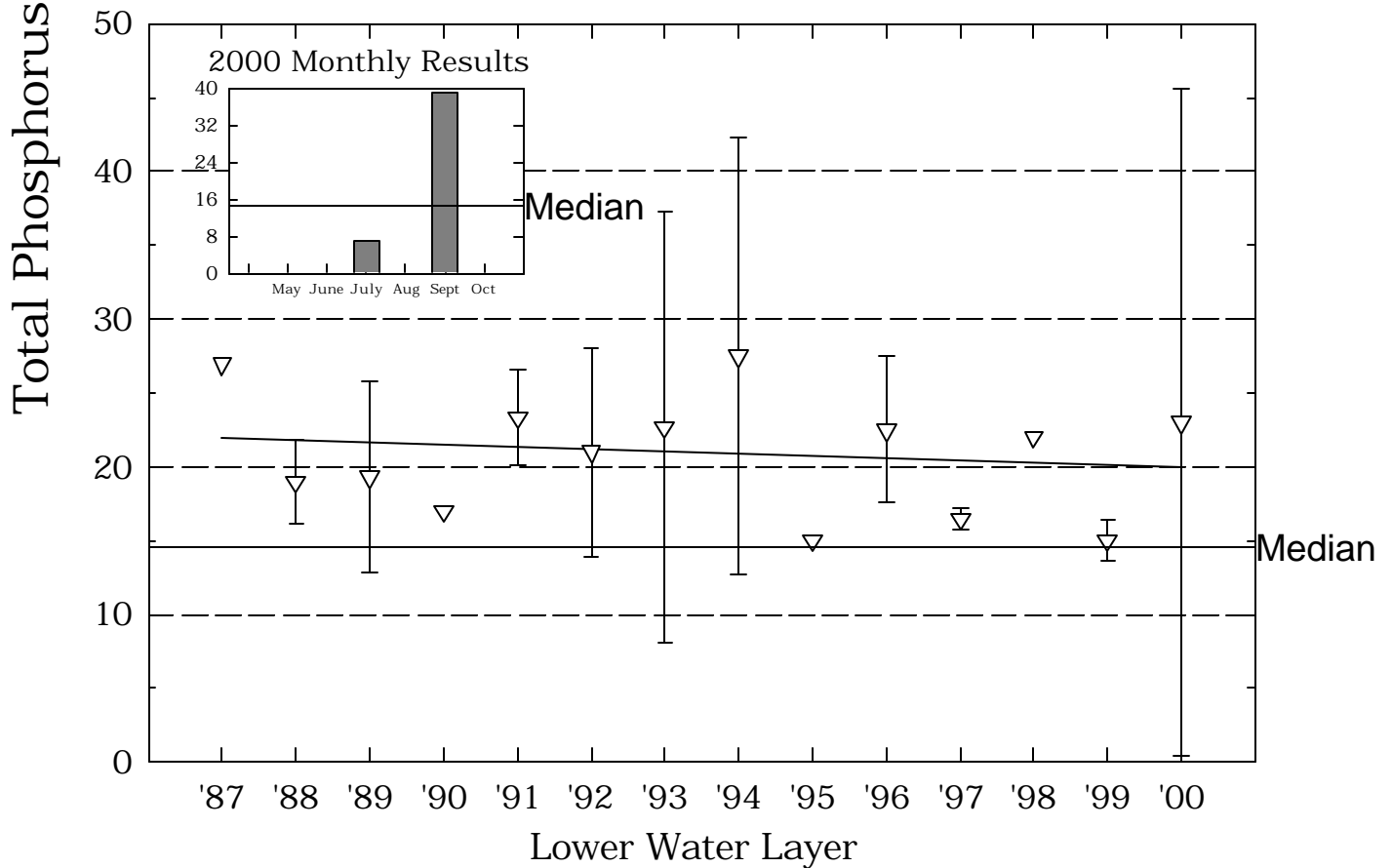
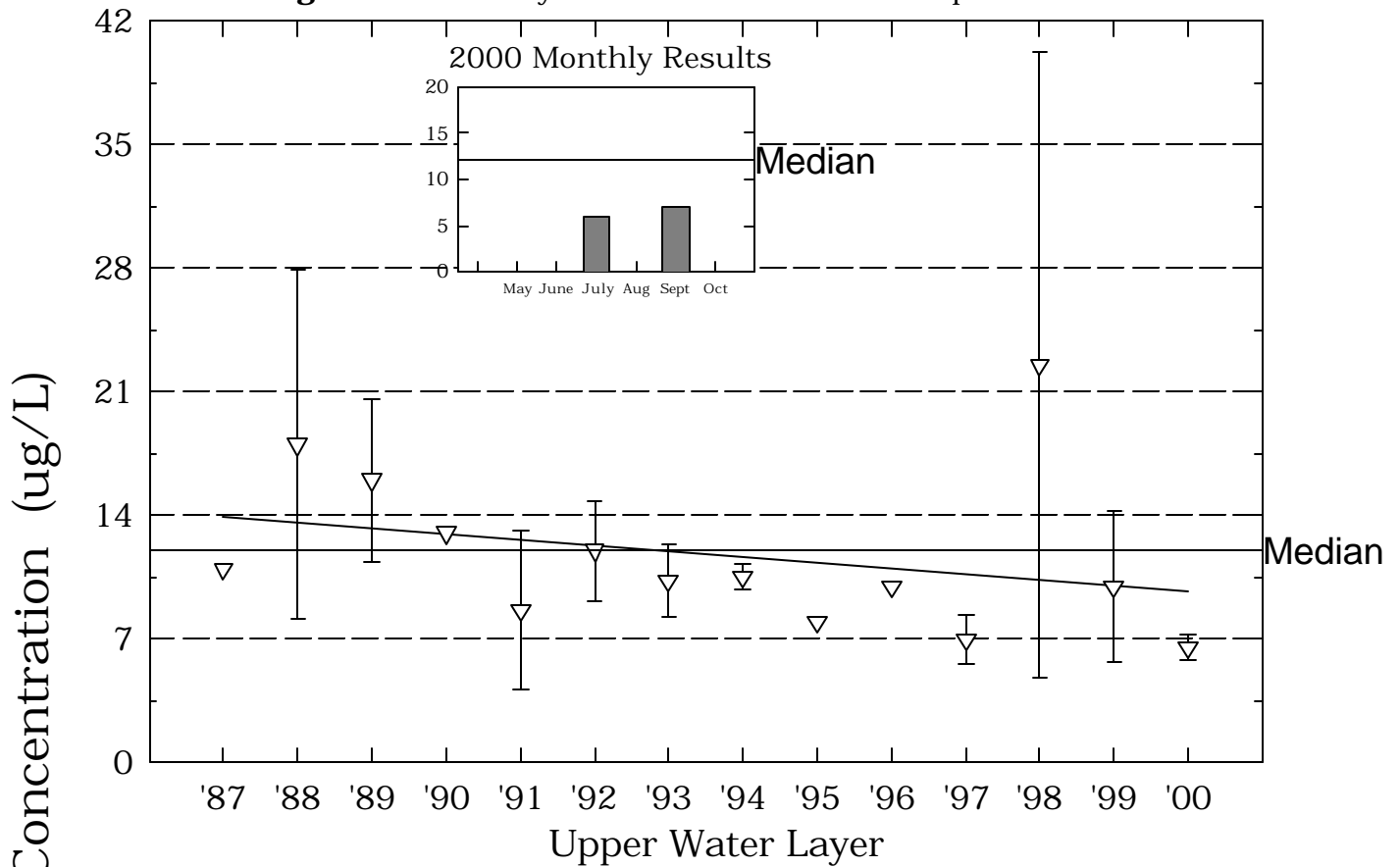


Table 1.**SUNCOOK POND, UPPER
BARNSTEAD****Chlorophyll-a results (mg/m³) for current year and historical
sampling periods.**

Year	Minimum	Maximum	Mean
1987	3.99	3.99	3.99
1988	2.78	4.77	3.77
1989	3.20	5.95	4.49
1990	3.08	5.41	4.24
1991	2.00	3.20	2.60
1992	2.37	3.46	2.90
1993	3.04	4.01	3.55
1994	2.54	2.81	2.67
1995	3.65	3.65	3.65
1996	2.92	4.77	3.84
1997	0.99	6.40	3.69
1998	3.80	3.84	3.82
1999	2.91	3.98	3.44
2000	1.99	3.20	2.59

Table 2.

**SUNCOOK POND, UPPER
BARNSTEAD**

**Phytoplankton species and relative percent abundance.
Summary for current and historical sampling seasons.**

Date of Sample	Species Observed	Relative % Abundance
08/28/1987	TABELLARIA	51
	ANACYSTIS	13
07/01/1988	UROGLENOPSIS	45
	ASTERIONELLA	35
06/23/1989	TABELLARIA	51
	DINOBRYON	37
	ASTERIONELLA	
07/30/1990	ASTERIONELLA	84
08/05/1991	ASTERIONELLA	50
	CERATIUM	23
	DINOBRYON	12
07/01/1992	SPHAEROCYSTIS	40
	MALLOMONAS	35
09/02/1993	COELOSPHAERIUM	48
	TABELLARIA	19
08/14/1996	SYNURA	45
	TABELLARIA	20
	ASTERIONELLA	17
06/23/1997	ASTERIONELLA	39
	TABELLARIA	38
	DINOBRYON	19
08/04/1998	CHRYSOSPHAERELLA	52
	TABELLARIA	29
	DINOBRYON	10
07/21/1999	CHRYSOSPHAERELLA	31
	ASTERIONELLA	21
	RHIZOLENIA	19

Table 2.

**SUNCOOK POND, UPPER
BARNSTEAD**

**Phytoplankton species and relative percent abundance.
Summary for current and historical sampling seasons.**

Date of Sample	Species Observed	Relative % Abundance
07/24/2000	SPHAEROCYSTIS	52
	ELAKATOTHRIX	31
	MALLOMONAS	10

Table 3.
SUNCOOK POND, UPPER
BARNSTEAD

**Summary of current and historical Secchi Disk
transparency results (in meters).**

Year	Minimum	Maximum	Mean
1987	4.0	4.0	4.0
1988	2.8	4.0	3.4
1989	2.6	4.0	3.3
1990	3.0	3.7	3.3
1991	3.5	4.7	4.2
1992	3.6	3.7	3.6
1993	4.8	5.5	5.1
1994	4.3	4.7	4.5
1995	4.5	4.5	4.5
1996	3.6	3.6	3.6
1997	3.0	3.4	3.2
1998	2.9	3.0	2.9
1999	2.8	3.6	3.2
2000	3.1	4.8	3.9

Table 4.**SUNCOOK POND, UPPER
BARNSTEAD**

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
CAMP FATIMA INLET	1987	6.72	6.72	6.72
	1990	6.70	6.70	6.70
	1996	6.46	6.46	6.46
	1997	6.31	6.31	6.31
	1998	6.28	6.45	6.36
	1999	5.91	6.72	6.15
	2000	6.32	6.32	6.32
CAMP FATIMA UPSTREAM	2000	7.01	7.01	7.01
EPILIMNION	1987	6.65	6.65	6.65
	1988	6.63	6.91	6.75
	1989	6.61	6.81	6.73
	1990	6.80	6.94	6.86
	1991	6.80	7.00	6.88
	1992	6.73	7.01	6.83
	1993	6.95	7.10	7.01
	1994	6.76	6.87	6.81
	1995	6.74	6.74	6.74
	1996	6.38	6.72	6.52
	1997	6.50	6.72	6.60
	1998	6.64	7.21	6.84
	1999	6.39	6.75	6.53
	2000	6.59	6.60	6.60

Table 4.**SUNCOOK POND, UPPER
BARNSTEAD****pH summary for current and historical sampling seasons.****Values in units, listed by station and year.**

Station	Year	Minimum	Maximum	Mean
HYPOLIMNION	1987	6.23	6.23	6.23
	1988	5.75	6.14	5.90
	1989	5.26	6.11	5.63
	1990	6.00	6.26	6.11
	1991	6.07	6.30	6.21
	1992	6.11	6.26	6.16
	1993	6.23	6.71	6.44
	1994	5.97	5.97	5.97
	1995	6.14	6.14	6.14
	1996	5.90	6.08	5.98
	1997	5.99	6.20	6.08
	1998	5.77	6.34	5.97
	1999	6.07	6.21	6.13
	2000	6.10	6.63	6.29
METALIMNION	1987	6.18	6.18	6.18
	1988	5.44	6.14	5.66
	1989	6.00	6.58	6.25
	1990	6.21	6.78	6.41
	1991	6.07	6.40	6.23
	1992	6.07	6.37	6.21
	1993	6.19	6.89	6.41
	1994	5.84	6.03	5.92
	1995	6.43	6.43	6.43
	1996	6.00	6.33	6.13
	1997	5.56	6.54	5.82

Table 4.

**SUNCOOK POND, UPPER
BARNSTEAD**

**pH summary for current and historical sampling seasons.
Values in units, listed by station and year.**

Station	Year	Minimum	Maximum	Mean
	1998	5.68	6.29	5.89
	1999	6.34	6.48	6.40
	2000	6.19	6.59	6.35
NIGHTHAWK HOLLOW				
	2000	6.51	6.66	6.58
OUTLET				
	1997	6.83	6.83	6.83
PUBLIC BEACH INLET				
	1987	6.74	6.74	6.74
	1988	5.97	6.62	6.18
	1989	6.51	6.73	6.63
	1990	6.70	6.72	6.71
	1991	6.40	6.70	6.52
	1992	6.80	6.80	6.80
	1993	6.34	6.78	6.58
	1994	6.53	6.67	6.59
	1995	6.59	6.59	6.59
	1996	6.22	6.53	6.35
	1997	6.06	6.06	6.06
	1998	6.33	6.33	6.33
	1999	6.18	6.58	6.34
	2000	6.60	6.71	6.65
SUNCOOK AT WHITE OAK				
	1988	6.13	6.13	6.13
	1989	6.39	6.69	6.53

Table 4.

**SUNCOOK POND, UPPER
BARNSTEAD**

**pH summary for current and historical sampling seasons.
Values in units, listed by station and year.**

Station	Year	Minimum	Maximum	Mean
SUNCOOK POND, UPPER BARNSTEAD	1990	6.59	6.72	6.65
	1991	6.80	6.88	6.84
	1992	6.58	6.76	6.66
	1993	6.72	7.39	6.86
	1994	6.63	6.63	6.63
	1995	6.62	6.62	6.62
	1996	6.37	6.70	6.50
	1997	6.49	6.63	6.55
	1998	6.46	6.54	6.50
	1999	6.34	6.41	6.37
SUNCOOK RIVER INLET	1987	6.80	6.80	6.80
	1988	6.11	6.32	6.20
	1989	6.42	6.52	6.45
	1990	6.73	6.73	6.73
	1991	6.50	6.70	6.56
	1992	6.49	6.69	6.58
	1993	6.35	6.60	6.46
	1994	6.49	6.63	6.55
	1995	6.43	6.43	6.43
	1996	6.52	6.52	6.52
	1998	6.30	6.57	6.41
	1999	6.27	6.48	6.36
	2000	6.58	6.60	6.59
WHITE OAK ROAD INLET	1994	6.67	6.67	6.67

Table 5.**SUNCOOK POND, UPPER
BARNSTEAD**

**Summary of current and historical Acid Neutralizing Capacity.
Values expressed in mg/L as CaCO₃.**

Epilimnetic Values

Year	Minimum	Maximum	Mean
1987	5.10	5.10	5.10
1988	4.60	4.80	4.70
1989	4.10	5.10	4.60
1990	4.70	5.90	5.30
1991	5.10	6.30	5.73
1992	4.40	5.20	4.87
1993	4.00	5.20	4.73
1994	3.40	3.90	3.65
1995	4.80	4.80	4.80
1996	4.20	4.60	4.40
1997	4.00	4.00	4.00
1998	3.80	4.80	4.30
1999	4.00	4.00	4.00
2000	4.40	4.70	4.55

Table 6.

**SUNCOOK POND, UPPER
BARNSTEAD**

**Specific conductance results from current and historic
sampling seasons. Results in uMhos/cm.**

Station	Year	Minimum	Maximum	Mean
CAMP FATIMA INLET	1987	37.2	37.2	37.2
	1990	42.4	42.4	42.4
	1996	57.9	57.9	57.9
	1997	58.5	58.5	58.5
	1998	51.3	61.5	56.4
	1999	47.6	51.1	49.3
	2000	53.0	53.0	53.0
CAMP FATIMA UPSTREAM	2000	51.9	51.9	51.9
EPILIMNION	1987	37.3	37.3	37.3
	1988	39.0	39.0	39.0
	1989	39.4	44.6	42.1
	1990	40.7	41.1	40.9
	1991	40.4	42.7	41.7
	1992	39.8	43.3	41.3
	1993	43.7	44.1	43.9
	1994	43.6	45.5	44.5
	1995	43.9	43.9	43.9
	1996	42.0	43.9	42.9
	1997	38.7	39.6	39.1
	1998	37.1	38.3	37.7
	1999	45.4	47.8	46.6
	2000	44.6	45.6	45.1

Table 6.

**SUNCOOK POND, UPPER
BARNSTEAD**

**Specific conductance results from current and historic
sampling seasons. Results in uMhos/cm.**

Station	Year	Minimum	Maximum	Mean
HYPOLIMNION	1987	42.9	42.9	42.9
	1988	38.2	41.9	40.1
	1989	43.1	47.1	45.7
	1990	40.8	42.5	41.6
	1991	42.7	49.6	46.5
	1992	44.3	48.4	45.6
	1993	41.9	58.1	47.3
	1994	44.6	47.1	45.8
	1995	45.1	45.1	45.1
	1996	42.9	44.2	43.5
	1997	37.6	41.6	39.6
	1998	38.6	50.0	44.3
	1999	46.1	47.6	46.8
	2000	44.4	51.1	47.7
METALIMNION	1987	38.0	38.0	38.0
	1988	38.2	40.0	39.1
	1989	40.1	43.6	42.2
	1990	40.4	42.0	41.2
	1991	40.1	44.6	42.6
	1992	41.9	45.1	43.7
	1993	41.5	43.4	42.5
	1994	42.7	44.7	43.7
	1995	43.2	43.2	43.2
	1996	41.9	43.6	42.7

Table 6.

**SUNCOOK POND, UPPER
BARNSTEAD**

**Specific conductance results from current and historic
sampling seasons. Results in uMhos/cm.**

Station	Year	Minimum	Maximum	Mean
	1997	38.7	42.4	40.5
	1998	35.6	38.6	37.1
	1999	45.3	47.6	46.4
	2000	44.9	45.7	45.3
NIGHTHAWK HOLLOW				
	2000	67.7	68.3	68.0
OUTLET				
	1997	39.5	39.5	39.5
PUBLIC BEACH INLET				
	1987	37.1	37.1	37.1
	1988	38.2	42.0	40.1
	1989	39.4	42.8	41.3
	1990	40.7	43.7	42.2
	1991	41.8	44.8	43.0
	1992	45.0	45.0	45.0
	1993	45.9	55.0	49.7
	1994	43.8	46.0	44.9
	1995	44.0	44.0	44.0
	1996	41.6	42.3	41.9
	1997	31.1	31.1	31.1
	1998	38.6	38.6	38.6
	1999	47.2	49.4	48.3
	2000	45.8	45.9	45.9
SUNCOOK AT WHITE OAK				
	1988	39.2	39.2	39.2
	1989	32.8	53.6	41.7

Table 6.

**SUNCOOK POND, UPPER
BARNSTEAD**

**Specific conductance results from current and historic
sampling seasons. Results in uMhos/cm.**

Station	Year	Minimum	Maximum	Mean
	1990	36.6	38.4	37.5
	1991	41.0	56.9	48.9
	1992	43.2	44.4	43.8
	1993	35.8	40.7	38.7
	1994	39.3	39.3	39.3
	1995	34.9	34.9	34.9
	1996	54.8	58.1	56.4
	1997	38.1	49.0	43.5
	1998	44.8	59.5	52.1
	1999	33.6	111.7	72.6
SUNCOOK RIVER INLET				
	1987	37.4	37.4	37.4
	1988	42.7	47.4	45.0
	1989	37.0	56.1	45.9
	1990	46.1	46.1	46.1
	1991	44.8	62.1	50.8
	1992	48.9	49.7	49.3
	1993	46.1	54.6	49.9
	1994	45.3	46.9	46.1
	1995	43.1	43.1	43.1
	1996	61.1	61.1	61.1
	1998	38.4	39.5	38.9
	1999	40.2	52.9	46.5
	2000	41.5	45.7	43.6
WHITE OAK ROAD INLET				
	1994	42.1	42.1	42.1

Table 8.

**SUNCOOK POND, UPPER
BARNSTEAD**

**Summary historical and current sampling season Total
Phosphorus data. Results in ug/L.**

Station	Year	Minimum	Maximum	Mean
CAMP FATIMA INLET	1987	9	9	9
	1990	20	20	20
	1997	32	32	32
	1998	38	62	50
	1999	9	16	12
	2000	20	20	20
CAMP FATIMA UPSTREAM	2000	17	17	17
EPILIMNION	1987	11	11	11
	1988	11	25	18
	1989	11	20	16
	1990	12	13	12
	1991	4	13	8
	1992	10	15	13
	1993	8	12	10
	1994	10	11	10
	1995	8	8	8
	1996	10	10	10
	1997	6	8	7
	1998	10	35	22
	1999	7	13	10
	2000	6	7	6

Table 8.

**SUNCOOK POND, UPPER
BARNSTEAD**

**Summary historical and current sampling season Total
Phosphorus data. Results in ug/L.**

Station	Year	Minimum	Maximum	Mean
HYPOLIMNION	1987	27	27	27
	1988	17	21	19
	1989	12	24	19
	1990	16	17	16
	1991	21	27	23
	1992	10	26	17
	1993	11	39	22
	1994	17	38	27
	1995	15	15	15
	1996	19	26	22
	1997	16	17	16
	1998	22	22	22
	1999	14	16	15
	2000	7	39	23
METALIMNION	1987	15	15	15
	1988	22	29	25
	1989	13	24	17
	1990	9	13	11
	1991	7	13	9
	1992	9	12	10
	1993	8	16	11
	1994	9	13	11
	1995	6	6	6
	1996	9	9	9

Table 8.**SUNCOOK POND, UPPER
BARNSTEAD****Summary historical and current sampling season Total
Phosphorus data. Results in ug/L.**

Station	Year	Minimum	Maximum	Mean
	1997	6	7	6
	1998	7	12	9
	1999	8	12	10
	2000	6	8	7
NIGHTHAWK HOLLOW				
	2000	7	16	11
OUTLET				
	1997	7	7	7
PUBLIC BEACH INLET				
	1987	6	6	6
	1988	27	29	28
	1989	13	21	16
	1990	18	79	48
	1991	8	17	13
	1992	16	16	16
	1993	11	24	17
	1994	17	21	19
	1995	9	9	9
	1996	9	12	10
	1997	16	16	16
	1998	17	17	17
	1999	7	22	14
	2000	7	9	8
SUNCOOK AT WHITE OAK				
	1988	25	25	25
	1989	14	17	15

Table 8.

**SUNCOOK POND, UPPER
BARNSTEAD**

**Summary historical and current sampling season Total
Phosphorus data. Results in ug/L.**

Station	Year	Minimum	Maximum	Mean
	1990	11	12	11
	1991	7	11	9
	1992	8	8	8
	1993	6	12	8
	1994	8	8	8
	1995	8	8	8
	1996	8	21	14
	1997	6	19	12
	1998	5	10	7
	1999	18	29	23
SUNCOOK RIVER INLET	1987	9	9	9
	1988	23	31	27
	1989	20	24	21
	1990	24	24	24
	1991	15	17	16
	1992	14	19	16
	1993	13	22	18
	1994	13	14	13
	1995	14	14	14
	1996	39	39	39
	1998	1	22	11
	1999	12	12	12
	2000	8	21	14
WHITE OAK ROAD INLET	1994	12	12	12

Table 9.
SUNCOOK POND, UPPER
BARNSTEAD

Current year dissolved oxygen and temperature data.

Depth (meters)	Temperature (celsius)	Dissolved Oxygen (mg/L)	Saturation (%)
July 24, 2000			
0.1	22.6	7.9	91.3
1.0	22.0	7.9	90.3
2.0	21.8	7.9	89.8
3.0	21.8	7.8	89.1
4.0	21.7	7.7	88.0
5.0	21.0	7.0	78.0
6.0	17.8	3.7	38.4
7.0	13.8	2.5	24.6
8.0	11.7	1.8	16.8
9.0	10.6	1.0	8.6
10.0	10.4	0.9	7.6
11.0	10.2	0.7	6.4
12.0	10.2	0.8	6.7

Table 10.
SUNCOOK POND, UPPER
BARNSTEAD

Historic Hypolimnetic dissolved oxygen and temperature data.

Date	Depth (meters)	Temperature (celsius)	Dissolved Oxygen (mg/L)	Saturation (%)
August 28, 1987	12.5	9.9	0.6	5.0
July 1, 1988	12.0	8.6	5.1	43.0
June 23, 1989	11.0	8.5	3.4	29.0
July 30, 1990	13.0	9.0	-0.5	-4.3
August 5, 1991	10.0	10.9	0.1	0.9
August 5, 1991	11.5	10.9	0.1	0.9
July 1, 1992	12.5	7.3	2.9	23.0
September 2, 1993	13.0	9.8	0.4	3.0
August 14, 1996	12.5	10.2	0.3	3.0
June 23, 1997	12.0	11.5	5.1	46.0
August 4, 1998	11.0	11.6	0.2	2.0
July 21, 1999	13.0	11.0	0.2	1.8
July 24, 2000	12.0	10.2	0.8	6.7

Table 11.

**SUNCOOK POND, UPPER
BARNSTEAD**

**Summary of current year and historic turbidity sampling.
Results in NTU's.**

Station	Year	Minimum	Maximum	Mean
CAMP FATIMA INLET	1997	1.6	1.6	1.6
	1998	1.5	3.4	2.4
	1999	0.6	0.9	0.8
	2000	0.9	0.9	0.9
CAMP FATIMA UPSTREAM	2000	1.4	1.4	1.4
EPILIMNION	1993	0.0	0.0	0.0
	1997	0.5	0.5	0.5
	1998	0.4	0.9	0.7
	1999	0.5	0.7	0.6
	2000	0.4	0.6	0.5
HYPOLIMNION	1993	0.0	0.0	0.0
	1997	1.0	8.7	4.8
	1998	2.9	3.7	3.3
	1999	3.6	5.5	4.5
	2000	0.4	23.0	11.7
METALIMNION	1993	0.0	0.0	0.0
	1997	0.6	0.7	0.6
	1998	0.5	1.1	0.8
	1999	0.9	1.0	0.9
	2000	0.4	0.6	0.5
NIGHTHAWK HOLLOW				

Table 11.

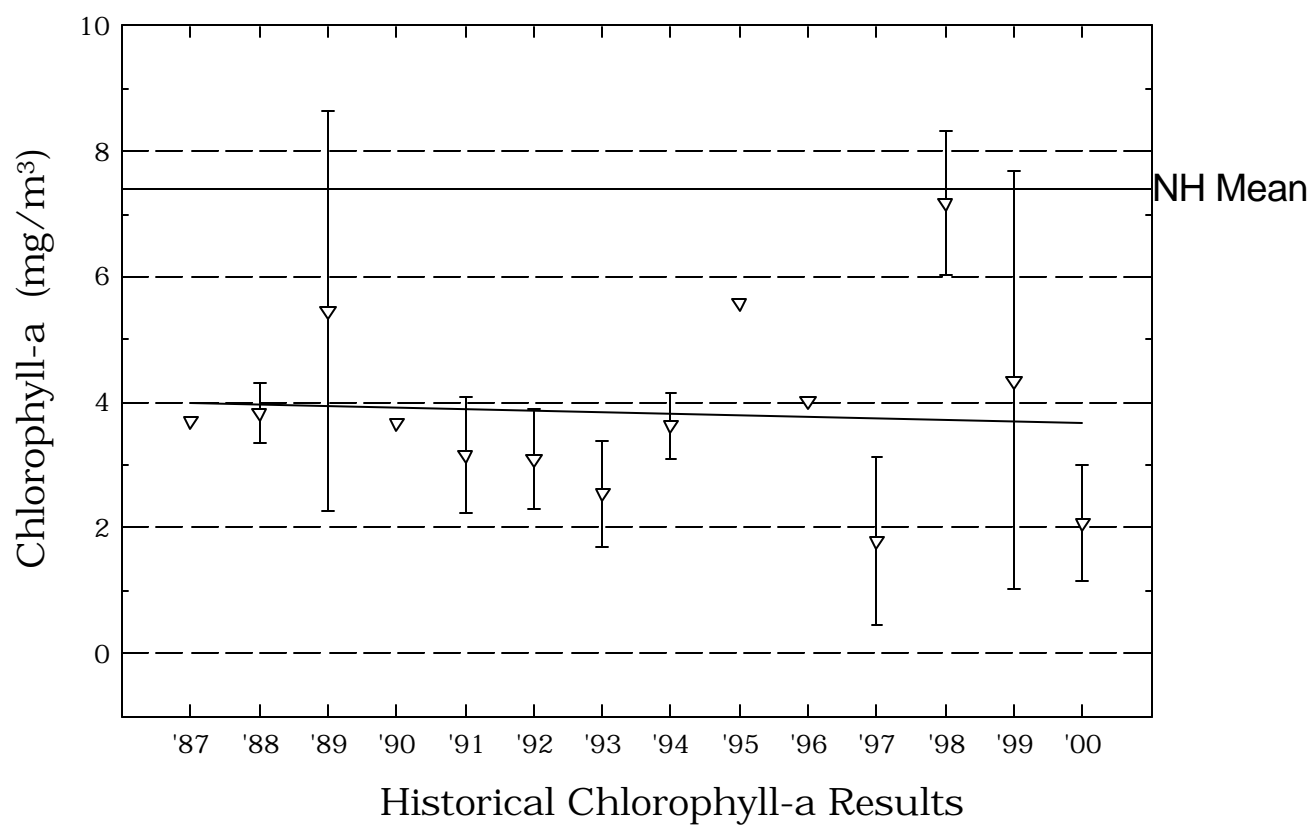
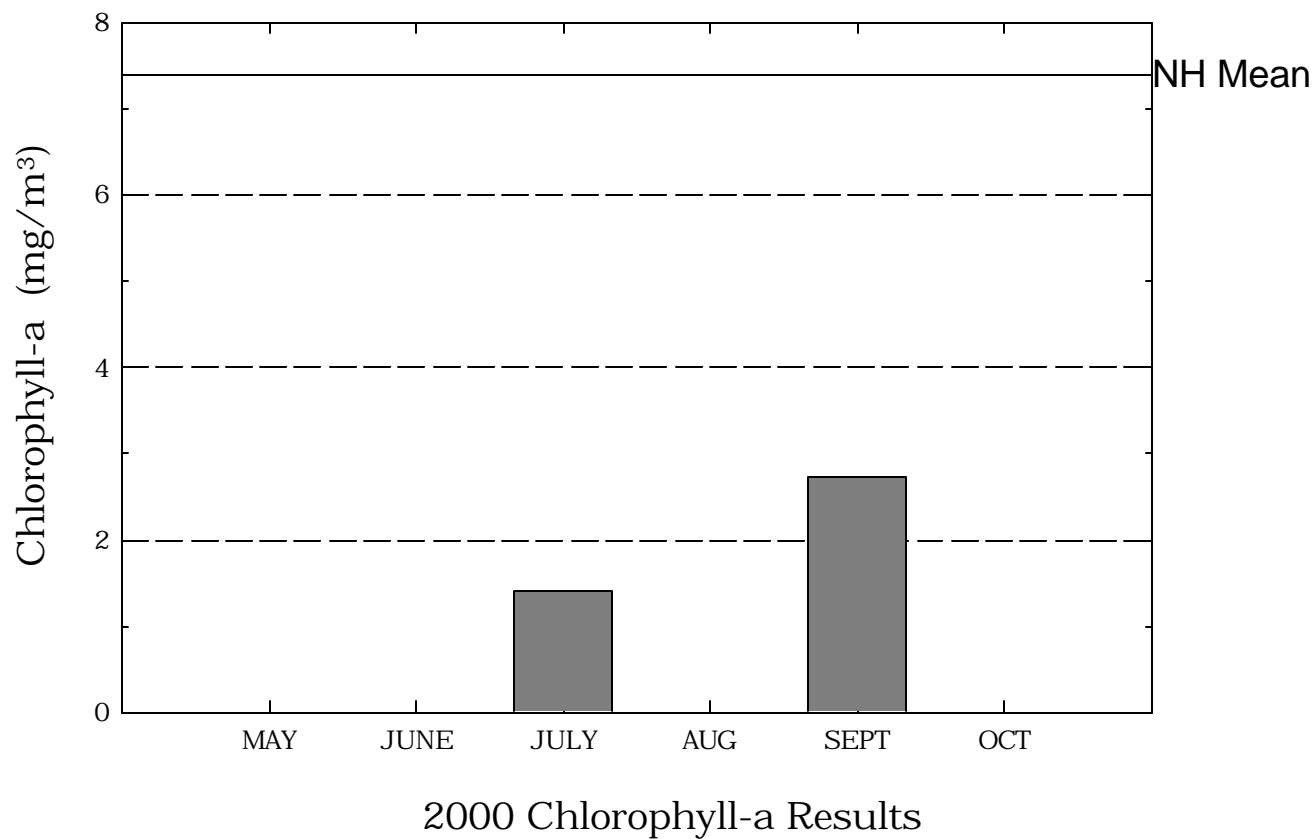
**SUNCOOK POND, UPPER
BARNSTEAD**

**Summary of current year and historic turbidity sampling.
Results in NTU's.**

Station	Year	Minimum	Maximum	Mean
OUTLET	2000	1.9	2.3	2.1
	1997	0.6	0.6	0.6
PUBLIC BEACH INLET	1993	0.0	0.0	0.0
	1997	2.3	2.3	2.3
	1998	1.9	1.9	1.9
	1999	0.5	1.3	0.9
	2000	0.4	0.6	0.5
SUNCOOK AT WHITE OAK	1993	0.0	0.0	0.0
	1997	0.5	0.7	0.6
	1998	0.4	1.5	1.0
	1999	0.8	5.2	3.0
SUNCOOK RIVER INLET	1993	0.0	0.0	0.0
	1998	0.8	0.9	0.9
	1999	0.8	0.9	0.9
	2000	0.6	0.6	0.6

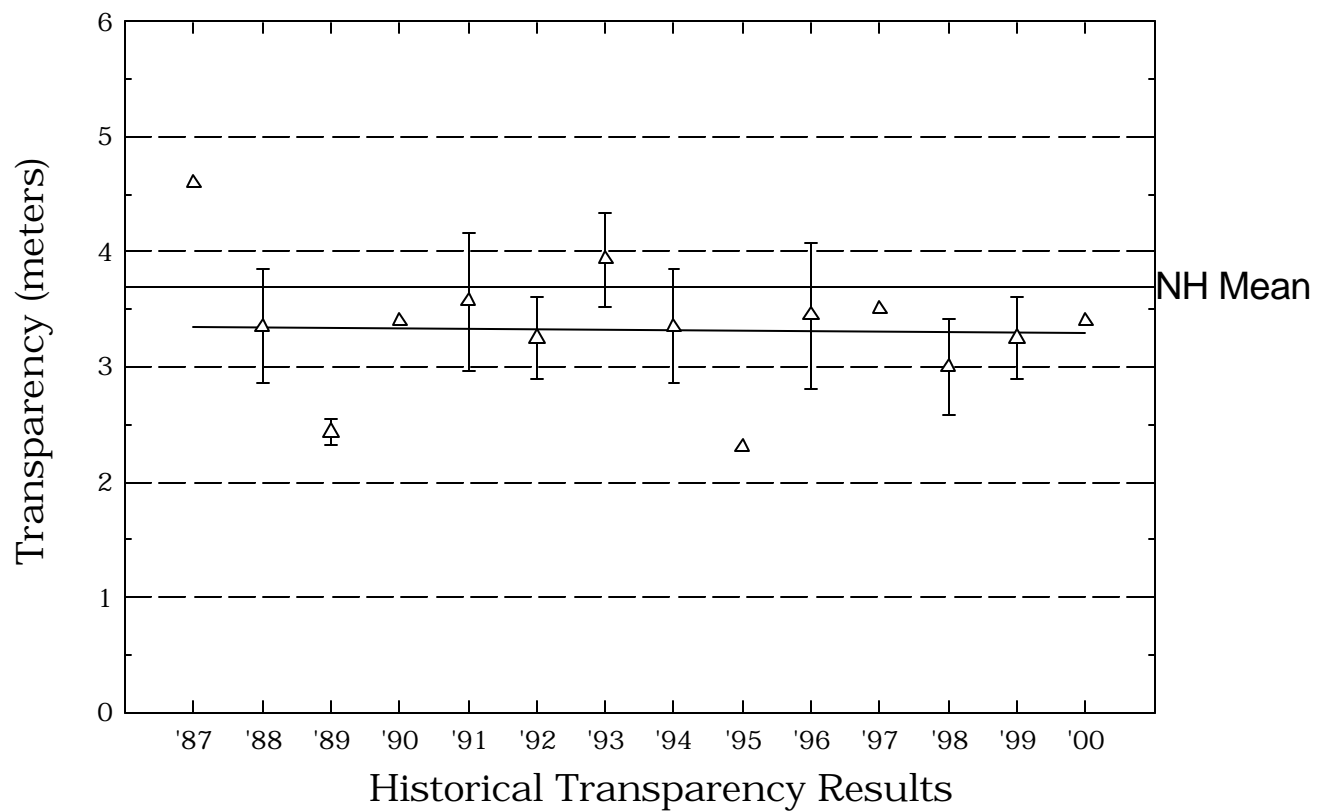
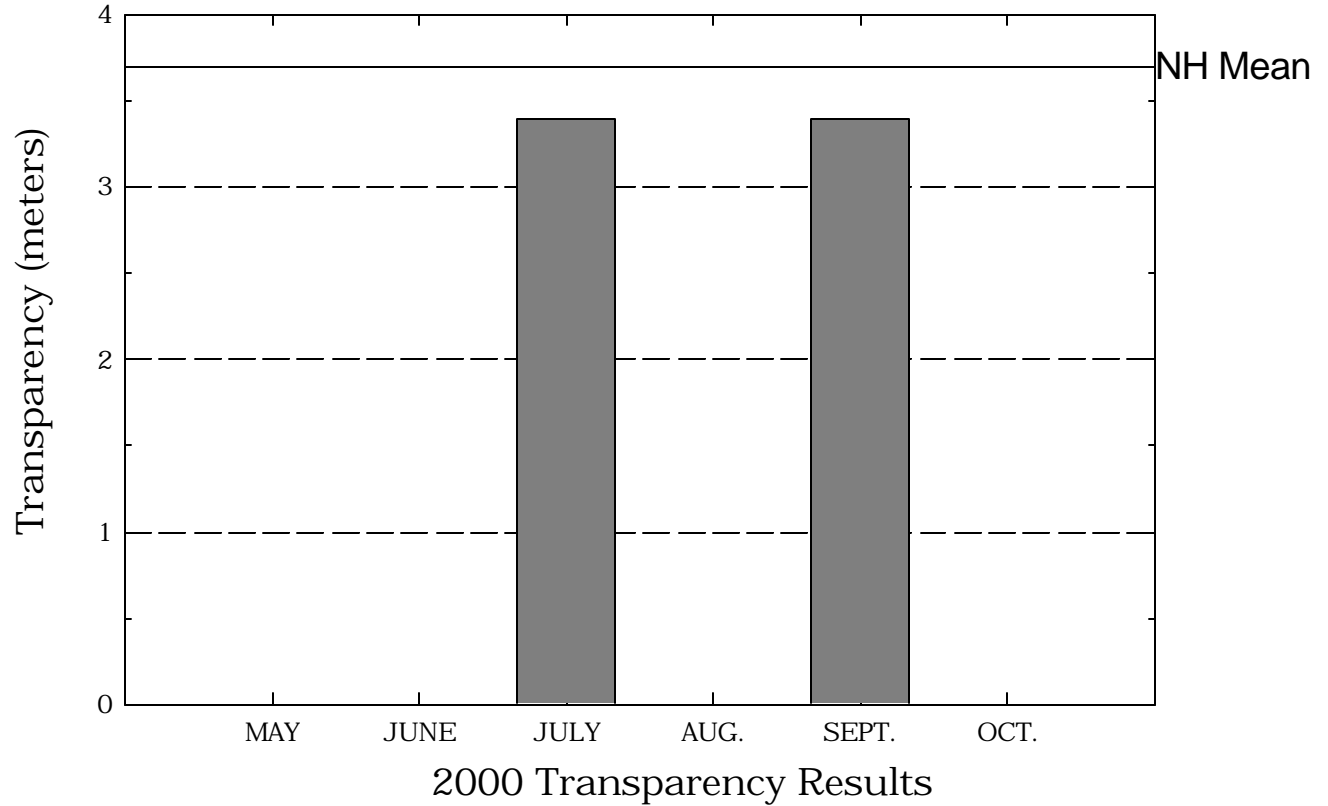
Lower Suncook Pond

Figure 1. Monthly and Historical Chlorophyll-a Results



Lower Suncook Pond

Figure 2. Monthly and Historical Transparency Results



Lower Suncook Pond

Figure 3. Monthly and Historical Total Phosphorus Data.

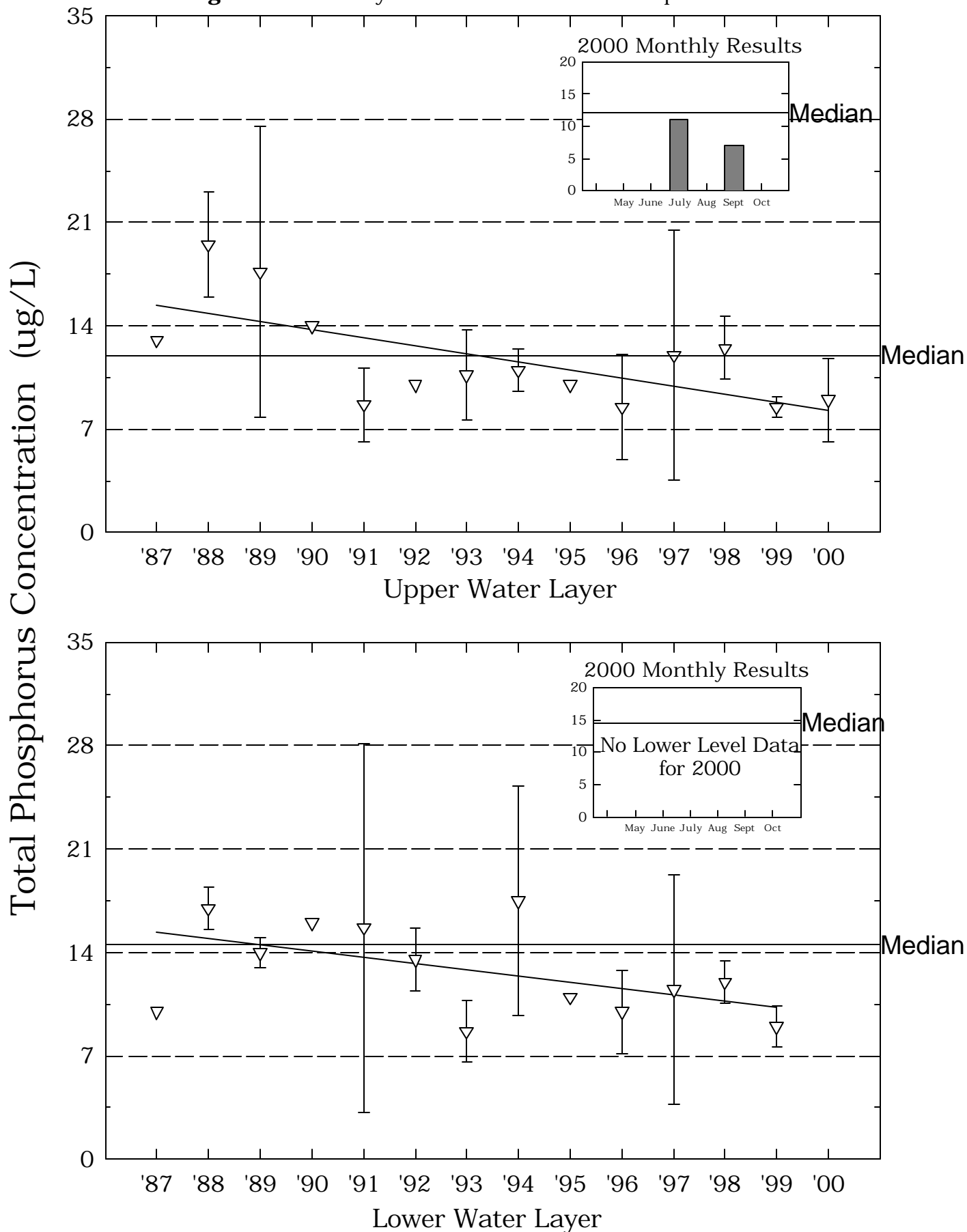


Table 1.**SUNCOOK POND, LOWER
BARNSTEAD****Chlorophyll-a results (mg/m³) for current year and historical
sampling periods.**

Year	Minimum	Maximum	Mean
1987	3.71	3.71	3.71
1988	3.49	4.17	3.83
1989	3.20	9.12	5.46
1990	3.67	4.38	4.02
1991	2.50	3.82	3.16
1992	2.54	4.17	3.45
1993	1.78	3.46	2.55
1994	3.26	4.00	3.63
1995	5.59	5.59	5.59
1996	4.01	4.05	4.03
1997	0.84	2.73	1.78
1998	6.38	8.00	7.19
1999	1.99	6.71	4.35
2000	1.42	2.72	2.07

Table 2.

**SUNCOOK POND, LOWER
BARNSTEAD**

**Phytoplankton species and relative percent abundance.
Summary for current and historical sampling seasons.**

Date of Sample	Species Observed	Relative % Abundance
08/28/1987	OSCILLATORIA	29
	TABELLARIA	24
07/01/1988	SPHAEROCYSTIS	25
	TABELLARIA	23
06/23/1989	TABELLARIA	40
	DINOBRYON	34
	ASTERIONELLA	
08/05/1991	CERATIUM	32
	ASTERIONELLA	25
	TABELLARIA	13
07/08/1992	SPHAEROCYSTIS	50
	MELOSIRA	20
	ASTERIONELLA	20
09/02/1993	BLUE GREEN SPECIES	40
	ANABAENA	12
07/31/1996	RHIZOSOLENIA	63
	CHRYSOSPHAERELLA	13
	MALLOMONAS	7
06/23/1997	TABELLARIA	55
	DINOBRYON	21
	ASTERIONELLA	15
08/04/1998	CHRYSOSPHAERELLA	91
	TABELLARIA	5
	ASTERIONELLA	3
07/21/1999	RHIZOSOLENIA	63
	DINOBRYON	12
	ASTERIONELLA	10
07/24/2000	SPHAEROCYSTIS	30
	MERISMOPEDIA	14
	ANABAENA	6

Table 3.
SUNCOOK POND, LOWER
BARNSTEAD

**Summary of current and historical Secchi Disk
transparency results (in meters).**

Year	Minimum	Maximum	Mean
1987	4.6	4.6	4.6
1988	3.0	3.7	3.3
1989	2.3	2.5	2.4
1990	2.5	3.4	2.9
1991	3.0	4.2	3.5
1992	3.0	3.5	3.3
1993	3.5	4.3	3.9
1994	3.0	3.7	3.3
1995	2.3	2.3	2.3
1996	3.0	3.9	3.4
1997	3.5	3.5	3.5
1998	2.7	3.3	3.0
1999	3.0	3.5	3.2
2000	3.4	3.4	3.4

Table 4.**SUNCOOK POND, LOWER
BARNSTEAD****pH summary for current and historical sampling seasons.****Values in units, listed by station and year.**

Station	Year	Minimum	Maximum	Mean
EPILIMNION	1987	6.98	6.98	6.98
	1988	6.65	6.72	6.68
	1989	6.75	6.81	6.77
	1990	6.56	6.92	6.70
	1991	6.80	7.00	6.92
	1992	6.79	6.94	6.84
	1993	6.86	7.03	6.94
	1994	6.77	6.90	6.83
	1995	6.79	6.79	6.79
	1996	6.38	6.45	6.41
	1997	6.46	6.79	6.59
	1998	6.29	6.68	6.44
	1999	6.13	6.89	6.36
	2000	6.66	6.69	6.67
HYPOLIMNION	1987	6.82	6.82	6.82
	1988	6.30	6.48	6.38
	1989	6.39	6.79	6.60
	1990	6.61	6.93	6.74
	1991	6.90	6.92	6.91
	1992	6.59	6.71	6.63
	1993	6.89	7.19	6.97
	1994	6.58	6.59	6.59
	1995	6.45	6.45	6.45
	1996	6.37	6.46	6.41
	1997	6.40	6.80	6.56

Table 4.**SUNCOOK POND, LOWER
BARNSTEAD**

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
HYPOLIMNION				
	1998	6.28	6.42	6.34
	1999	6.13	6.46	6.26
INLET				
	1995	6.59	6.59	6.59
METALIMNION				
	1996	6.30	6.30	6.30
MORIN'S INLET				
	1998	6.34	6.39	6.36
	2000	6.09	6.11	6.10
NARROWS BRIDGE INLET				
	1987	6.78	6.78	6.78
	1988	6.13	6.62	6.31
	1989	6.63	6.71	6.68
	1990	6.75	7.12	6.90
	1991	6.80	6.97	6.85
	1992	6.67	6.89	6.77
	1993	6.79	6.94	6.88
	1994	6.57	6.86	6.69
	1996	6.32	6.32	6.32
	1997	6.65	6.65	6.65
	1998	6.35	6.35	6.35
	1999	6.02	6.49	6.19
	2000	6.58	6.73	6.65

Table 4.

**SUNCOOK POND, LOWER
BARNSTEAD**

**pH summary for current and historical sampling seasons.
Values in units, listed by station and year.**

Station	Year	Minimum	Maximum	Mean
NARROWS ROAD INLET	1987	6.81	6.81	6.81
	1988	5.87	5.95	5.91
	1989	5.86	6.05	5.94
	1990	6.22	6.82	6.42
	1991	6.00	6.30	6.17
	1992	6.16	6.33	6.24
	1993	6.27	6.61	6.44
	1994	6.09	6.17	6.13
	1995	6.22	6.22	6.22
	1996	6.41	6.47	6.44
	1997	6.30	6.35	6.32
	1998	6.20	6.37	6.28
	1999	5.92	6.65	6.15
	2000	6.11	6.11	6.11
OUTLET	1987	6.89	6.89	6.89
	1988	6.28	6.57	6.40
	1989	6.67	6.75	6.70
	1990	6.59	6.95	6.73
	1991	6.80	6.83	6.81
	1992	6.73	6.84	6.78
	1993	6.81	6.92	6.86
	1994	6.70	6.73	6.71
	1995	6.62	6.62	6.62
	1996	6.46	6.58	6.52
	1997	6.61	6.75	6.67

Table 4.

**SUNCOOK POND, LOWER
BARNSTEAD**

**pH summary for current and historical sampling seasons.
Values in units, listed by station and year.**

Station	Year	Minimum	Maximum	Mean
	1998	6.55	6.58	6.56
	1999	6.23	6.60	6.38
	2000	6.52	6.58	6.55

Table 5.**SUNCOOK POND, LOWER
BARNSTEAD**

**Summary of current and historical Acid Neutralizing Capacity.
Values expressed in mg/L as CaCO₃.**

Epilimnetic Values

Year	Minimum	Maximum	Mean
1987	8.00	8.00	8.00
1988	4.40	4.70	4.55
1989	3.90	5.00	4.57
1990	2.80	4.30	3.55
1991	4.10	5.80	5.13
1992	4.20	5.30	4.93
1993	4.60	5.20	4.87
1994	4.40	4.90	4.65
1995	4.30	4.30	4.30
1996	3.30	3.70	3.50
1997	3.30	4.70	4.00
1998	2.40	3.50	2.95
1999	2.70	3.90	3.30
2000	3.60	4.30	3.95

Table 6.

**SUNCOOK POND, LOWER
BARNSTEAD**

**Specific conductance results from current and historic
sampling seasons. Results in uMhos/cm.**

Station	Year	Minimum	Maximum	Mean
EPILIMNION	1987	36.3	36.3	36.3
	1988	38.4	38.7	38.5
	1989	39.8	41.8	40.9
	1990	40.2	41.2	40.7
	1991	41.8	43.1	42.4
	1992	41.3	42.8	42.2
	1993	41.5	43.2	42.3
	1994	43.5	45.2	44.3
	1995	43.9	43.9	43.9
	1996	40.8	42.0	41.4
	1997	37.2	39.1	38.1
	1998	34.5	34.5	34.5
	1999	43.8	45.5	44.6
	2000	42.9	44.0	43.5
HYPOLIMNION	1987	36.3	36.3	36.3
	1988	38.6	38.9	38.7
	1989	39.9	41.7	41.0
	1990	40.5	41.9	41.2
	1991	41.5	43.1	42.5
	1992	42.9	43.0	42.9
	1993	41.8	43.0	42.3
	1994	44.1	45.1	44.6
	1995	44.1	44.1	44.1
	1996	39.6	40.8	40.2

Table 6.

**SUNCOOK POND, LOWER
BARNSTEAD**

**Specific conductance results from current and historic
sampling seasons. Results in uMhos/cm.**

Station	Year	Minimum	Maximum	Mean
	1997	37.7	41.6	39.6
	1998	34.8	35.3	35.0
	1999	43.2	45.4	44.3
INLET				
	1995	43.5	43.5	43.5
METALIMNION				
	1996	41.2	41.2	41.2
MORIN'S INLET				
	1998	34.3	39.9	37.1
	2000	37.6	38.9	38.3
NARROWS BRIDGE INLET				
	1987	36.9	36.9	36.9
	1988	39.2	39.2	39.2
	1989	38.6	42.6	41.0
	1990	40.7	41.5	41.1
	1991	39.9	42.3	41.4
	1992	43.1	43.5	43.3
	1993	42.5	44.1	43.0
	1994	44.5	44.7	44.6
	1996	41.3	41.3	41.3
	1997	38.2	38.2	38.2
	1998	36.4	36.4	36.4
	1999	45.4	46.8	46.1
	2000	44.0	45.3	44.7

Table 6.

**SUNCOOK POND, LOWER
BARNSTEAD**

**Specific conductance results from current and historic
sampling seasons. Results in uMhos/cm.**

Station	Year	Minimum	Maximum	Mean
NARROWS ROAD INLET	1987	36.4	36.4	36.4
	1988	22.5	22.5	22.5
	1989	21.4	23.0	22.4
	1990	25.0	39.9	32.4
	1991	26.2	28.4	27.4
	1992	24.2	25.5	24.8
	1993	27.1	29.2	28.2
	1994	27.8	31.3	29.5
	1995	25.8	25.8	25.8
	1996	39.9	43.0	41.4
	1997	34.7	34.9	34.8
	1998	32.5	34.1	33.3
	1999	36.2	42.5	39.3
	2000	25.1	25.1	25.1
OUTLET	1987	36.5	36.5	36.5
	1988	38.2	39.0	38.6
	1989	39.0	41.5	40.6
	1990	40.8	41.3	41.0
	1991	40.8	42.7	41.9
	1992	42.3	43.0	42.6
	1993	42.2	43.3	42.6
	1994	44.1	45.2	44.6
	1995	44.8	44.8	44.8
	1996	39.7	41.7	40.7

Table 6.

**SUNCOOK POND, LOWER
BARNSTEAD**

**Specific conductance results from current and historic
sampling seasons. Results in uMhos/cm.**

Station	Year	Minimum	Maximum	Mean
	1997	37.0	40.7	38.8
	1998	34.6	35.3	34.9
	1999	43.9	45.3	44.6
	2000	42.7	43.7	43.2

Table 8.**SUNCOOK POND, LOWER
BARNSTEAD****Summary historical and current sampling season Total
Phosphorus data. Results in ug/L.**

Station	Year	Minimum	Maximum	Mean
EPILIMNION	1987	13	13	13
	1988	17	22	19
	1989	11	29	17
	1990	14	15	14
	1991	6	11	8
	1992	10	11	10
	1993	8	14	10
	1994	10	12	11
	1995	10	10	10
	1996	6	11	8
	1997	6	18	12
	1998	11	14	12
	1999	8	9	8
	2000	7	11	9
HYPOLIMNION	1987	10	10	10
	1988	16	18	17
	1989	13	15	14
	1990	13	16	14
	1991	7	30	15
	1992	12	15	13
	1993	7	11	8
	1994	12	23	17
	1995	11	11	11
	1996	8	12	10

Table 8.

**SUNCOOK POND, LOWER
BARNSTEAD**

**Summary historical and current sampling season Total
Phosphorus data. Results in ug/L.**

Station	Year	Minimum	Maximum	Mean
	1997	6	17	11
	1998	11	13	12
	1999	8	10	9
INLET				
	1995	8	8	8
METALIMNION				
	1996	13	13	13
MORIN'S INLET				
	1998	14	38	26
	2000	14	18	16
NARROWS BRIDGE INLET				
	1987	8	8	8
	1988	12	13	12
	1989	9	12	10
	1990	12	13	12
	1991	5	13	8
	1992	8	10	9
	1993	4	15	8
	1994	11	12	11
	1996	6	6	6
	1997	16	16	16
	1998	23	23	23
	1999	7	9	8
	2000	< 5	6	5

Table 8.

**SUNCOOK POND, LOWER
BARNSTEAD**

**Summary historical and current sampling season Total
Phosphorus data. Results in ug/L.**

Station	Year	Minimum	Maximum	Mean
NARROWS ROAD INLET	1987	9	9	9
	1988	40	48	44
	1989	16	40	30
	1990	12	49	30
	1991	33	54	41
	1992	18	24	21
	1993	21	47	30
	1994	22	25	23
	1995	28	28	28
	1996	3	9	6
	1997	8	21	14
	1998	5	15	10
	1999	9	12	10
	2000	21	21	21
OUTLET	1987	12	12	12
	1988	14	16	15
	1989	10	25	16
	1990	13	17	15
	1991	7	15	10
	1992	10	12	11
	1993	7	15	9
	1994	13	14	13
	1995	12	12	12
	1996	6	10	8

Table 8.

**SUNCOOK POND, LOWER
BARNSTEAD**

**Summary historical and current sampling season Total
Phosphorus data. Results in ug/L.**

Station	Year	Minimum	Maximum	Mean
	1997	7	15	11
	1998	10	10	10
	1999	7	10	8
	2000	6	6	6

Table 9.
SUNCOOK POND, LOWER
BARNSTEAD

Current year dissolved oxygen and temperature data.

Depth (meters)	Temperature (celsius)	Dissolved Oxygen (mg/L)	Saturation (%)
July 24, 2000			
0.1	24.0	7.8	93.1
0.1	24.0	7.8	93.1
1.0	23.1	7.9	92.7
1.0	23.1	7.9	92.7
2.0	22.9	8.2	95.3
2.0	22.9	8.2	95.3
3.0	22.7	8.2	94.6
3.0	22.7	8.2	94.6
4.0	22.6	7.9	91.2
4.0	22.6	7.9	91.2

Table 10.
SUNCOOK POND, LOWER
BARNSTEAD

Historic Hypolimnetic dissolved oxygen and temperature data.

Date	Depth (meters)	Temperature (celsius)	Dissolved Oxygen (mg/L)	Saturation (%)
August 28, 1987	4.5	20.0	6.5	70.0
July 1, 1988	4.0	20.4	8.5	93.0
June 23, 1989	4.5	16.4	5.2	53.0
July 30, 1990	4.5	21.6	0.2	2.3
August 5, 1991	4.0	19.0	7.4	80.2
July 8, 1992	4.5	20.0	6.8	74.0
September 2, 1993	5.0	23.0	5.8	67.0
July 31, 1996	4.0	21.0	5.6	62.0
June 23, 1997	4.0	20.0	6.3	69.0
August 4, 1998	4.0	23.1	4.7	54.0
July 21, 1999	5.0	24.7	6.5	78.0
July 24, 2000	4.0	22.6	7.9	91.2

Table 11.

**SUNCOOK POND, LOWER
BARNSTEAD**

**Summary of current year and historic turbidity sampling.
Results in NTU's.**

Station	Year	Minimum	Maximum	Mean
EPILIMNION	1997	0.6	0.7	0.6
	1998	0.6	1.2	0.9
	1999	0.6	0.7	0.7
	2000	0.6	0.8	0.7
HYPOLIMNION	1997	0.4	0.9	0.6
	1998	0.8	1.4	1.1
	1999	0.7	0.7	0.7
MORIN'S INLET	1998	0.8	12.1	6.4
	2000	1.9	4.3	3.1
NARROWS BRIDGE INLET	1993	0.0	0.0	0.0
	1997	3.1	3.1	3.1
	1998	0.4	0.4	0.4
	1999	0.8	0.9	0.8
	2000	0.3	0.5	0.4
NARROWS ROAD INLET	1997	0.6	0.8	0.7
	1998	0.5	1.9	1.2
	1999	0.6	0.7	0.7
	2000	0.5	0.5	0.5
OUTLET	1997	0.4	0.9	0.7
	1998	0.5	0.7	0.6

Table 11.

**SUNCOOK POND, LOWER
BARNSTEAD**

**Summary of current year and historic turbidity sampling.
Results in NTU's.**

Station	Year	Minimum	Maximum	Mean
	1999	0.5	0.7	0.6
	2000	0.5	0.5	0.5